

REMARKS

In the Final Office Action¹ ("Office Action"), the Examiner took the following actions:

rejected claims 2, 4-9, 13-15, and 21-24 under 35 U.S.C. § 103(a) as being unpatentable over Mashino et al. (U.S. Publication No. 2002/0190375 A1, "Mashino") in view of Mikawa et al. (U.S. Publication No. 2002/0115226 A1, "Mikawa");

rejected claims 10-12 under 35 U.S.C. § 103(a) as being unpatentable over Mashino in view of Mikawa and Mayashita et al. (U.S. Publication No. 2001/0045605 A1, "Mayashita"); and

rejected claims 16-20 under 35 U.S.C. § 103(a) as being unpatentable over Mashino in view of Mikawa and Sakao (U.S. Patent No. 6,166,425).

Claims 1 and 3 are cancelled, and, thus claims 2 and 4-24 remain under examination.

In a Request for Reconsideration After Final ("Request") submitted June 22, 2006, Applicant pointed out to the Examiner that the rejections based on Mashino and Mikawa were improper at least because the Examiner failed to respond to each and every argument raised by Applicant in the Request. Request at 2. In addition to the reasons submitted in the Request, Applicant submits the following additional reasons for the allowance of the pending claims over the references cited by the Examiner.

Applicant respectfully requests the Examiner reconsider and withdraw of the rejections of claims 2, 4-9, 13-15, and 21-24 under 35 U.S.C. § 103(a). In support of this request, Applicant submits the additional reasons discussed below.

¹ The Office Action contains a number of statements reflecting characterizations of the related art and the claims. Regardless of whether any such statement is identified herein, Applicants decline to automatically subscribe to any statement or characterization in the Office Action.

To establish a *prima facie* case of obviousness, three basic criteria must be satisfied. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a reference or to combine references. Second, there must be a reasonable expectation of success. Third, the prior art reference (or references when combined) must teach or suggest all of the claim elements. See M.P.E.P. § 2143. Moreover, the requisite teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure. See *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). See M.P.E.P. § 706.02(j).

Applicant respectfully traverses the rejection of claims 2, 4-9, 13-15, and 21-24 because Mashino and Mikawa, either alone or in combination, for at least the reason that the references fail to teach a motivation or suggestion to combine the references in the manner proposed by the Examiner. Claim 2 recites a semiconductor device including:

- a plurality of diffusion layer patterns formed on the semiconductor substrate;

- an insulation film formed between the diffusion layer patterns on the semiconductor substrate; and

- a through plug formed to be partly surrounded by the diffusion layer patterns without being in contact with the insulation film and to pass through the diffusion layer patterns and the semiconductor substrate.

In FIG. 10, Mashino discloses conductor 217 formed to pass through element formation layer 202 and semiconductor substrate 201. The Examiner admits that the element formation layer 202 taught by Mashino does not include "diffusion layer

patterns or an insulation film formed between the diffusion layer patterns,” as recited in claim 2. Office Action at page 4. However, the Examiner contends that “Mikawa teaches a plurality of diffusion layer patterns . . . and an insulation film formed between the plural diffusion layer patterns.” Id.

In particular, the Examiner alleges that heavily doped diffusion layers 11a and isolation films 12 illustrated in FIG. 1 of Mikawa correspond to the claimed “plurality of diffusion layer patterns” and the “insulation film formed between the diffusion layer patterns,” recited for example in claim 2. The Examiner concludes that given the above discussed elements taught by Mashino and Mikawa, “one of ordinary skill in the art . . . [would] provide the semiconductor element formation layer of Mashino with a diffusion layer pattern and insulation film as taught by Mikawa . . . [to form a] through plug to pass through and be partly surrounded by the diffusion layer pattern, in order to realize a ferroelectric memory device.” Id.

Applicant respectfully disagrees. “A general allegation that the claims define a patentable invention without any reference to the examiner’s assertion of official notice would be inadequate.” M.P.E.P. §§ 2144.03(C). Furthermore, when asserting knowledge common to the art “any facts so noticed should be of notorious character and serve only to ‘fill in the gaps’ in an insubstantial manner which might exist in the evidentiary showing made by the examiner to support a particular ground for rejection.” M.P.E.P. §§ 2144.03(E).

Here, the Examiner does not take Official Notice but merely asserts that the generalize purpose of forming “a ferroelectric memory device having a capacitor element . . . an [] a method for fabricating the same” taught by Mikawa provides the

requisite motivation to modify Mashino. Para. [0001]. However, one of ordinary skill in the art would not modify Mashino based on Mikawa because, as noted by Applicant at pages 12-13 in the Amendment filed February 21, 2006, Mashino and Mikawa are specifically directed towards the solution of different problems associated with semiconductor fabrication. Furthermore, neither Mashino nor Mikawa teach or suggest which of heavily doped diffusion layers 11a and isolation films 12 would be provided to element formation layer 202 and conductor 217 taught by Mashino. Thus, at best, the Examiner has engaged in impermissible hindsight in forming his proposed combination. Accordingly, Applicant respectfully requests that the Examiner take Official Notice, provide a reference in support of his allegations, or withdraw the rejection of claim 2.

Moreover, even if Mashino and Mikawa did teach the elements alleged by the Examiner or the references disclosed some motivation to combine the elements in the proposed manner, which Applicant respectfully submits they do not, neither Mashino nor Mikawa teach or suggest how heavily doped diffusion layers 11a or isolation insulating films 12, (to the extent these elements respectively correspond to the claimed "diffusion layer patterns" and "insulation film") would be provided to conductor 217 taught by Mashino such that the combination would produce the claimed "through plug formed to be partly surrounded by the diffusion layer patterns without being in contact with the insulation film and to pass through the diffusion layer patterns and the semiconductor substrate," as recited in claim 2.

In particular, Applicant notes that Mashino discloses a diameter of through hole 212 in which conductor 217 is formed is on the order of tens of micrometers as shown in FIGS 2A-2D of Mashino. In contrast, Mikawa discloses a distance from an arbitrary

position on the upper surface of lower electrode 15 to a nearest end portion thereof is about 0.6 micrometers or less. See, for example, claim 1 of Mikawa. In paragraph [0045] of Mikawa, the reference discloses lower electrode 15 has sides of 1.0 micrometers. Therefore, Mikawa teaches heavily doped diffusion layers 11a, each of which is respectively accompanied with the lower electrode 15, formed on the order of micrometers.

Accordingly, one of ordinary skill in the art would not combine the micrometer scale ferroelectric memory device taught by Mikawa with the tens of micrometer scale conductor 217 taught by Mashino at least because the conductor 217 would *necessarily be in contact* with heavily doped diffusion layer 11a and insulation films 12 of Mikawa, thus altering the method or mode of operation of at least one of the references or, at a minimum, fail to provide “a through plug formed to be partly surrounded by the diffusion layer patterns *without being in contact with the insulation film* and to pass through the diffusion layer patterns and the semiconductor substrate,” (emphasis added) as recited in claim 2.

For each of the above discussed reasons, Applicant respectfully submits that there is no motivation or suggestion to combine the references in the manner proposed by the Examiner disclosed, either alone or in combination, by Mashino and Mikawa, and one of ordinary skill in the art would not combine the references in the proposed manner. Thus, no *prima facie* of obviousness is establish with respect to claim 2 based on Mashino and Mikawa.

Independent claims 7 and 9 recite similar limitations to claim 2 and therefore no *prima facie* case of obviousness is established based on Mashino and Mikawa for

similar reasons as claim 2. In addition, claims 4-6, 8, 13-15, and 21-24 depend from their corresponding independent claims 2, 7, or 9, and incorporate each and every element recited therein. Claims 4-6, 8, 13-15, and 21 are also not obvious based Mashino and Mikawa for the same reasons as their corresponding independent claim. In light of the above discussed reasons and those submitted in the Request for Reconsideration After Final filed June 22, 2006, Applicant respectfully requests reconsideration by the Examiner and withdrawal of the rejection of claims 2, 4-9, 13-15, and 21-24 under 35 U.S.C. § 103(a).

Applicant also traverses the rejection of claims 10-12 under 35 U.S.C. § 103(a) and claims 16-20 under 35 U.S.C. § 103(a) for the reasons discussed above and for the reasons submitted in the in the Request for Reconsideration After Final filed June 22, 2006. In particular, neither Mayashita nor Sakao suggest a motivation to modify either Mashino or Mikawa in the manner proposed by the Examiner, and thus both Mayashita and Sakao fail to cure the above discussed deficiencies of Mashino and Mikawa in this regard. Thus, Applicant requests that the Examiner reconsider and withdraw the rejection of claims 10-12 and 16-20 under 35 U.S.C. § 103(a).

In view of the foregoing remarks, Applicant submits that this claimed invention is not rendered obvious based on the Examiner's proposed combination of the prior art references cited against this application. Applicant respectfully requests the Examiner's reexamination of the application and withdrawal of the rejections of claims 2, 4-9, 13-15, and 21-24 under 35 U.S.C. § 103(a), the rejection of claims 10-12 under 35 U.S.C. § 103(a), and the rejection of claims 16-20 under 35 U.S.C. § 103(a), and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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Dated: July 10, 2006

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